

The 2015 IMC

What Are The Changes?

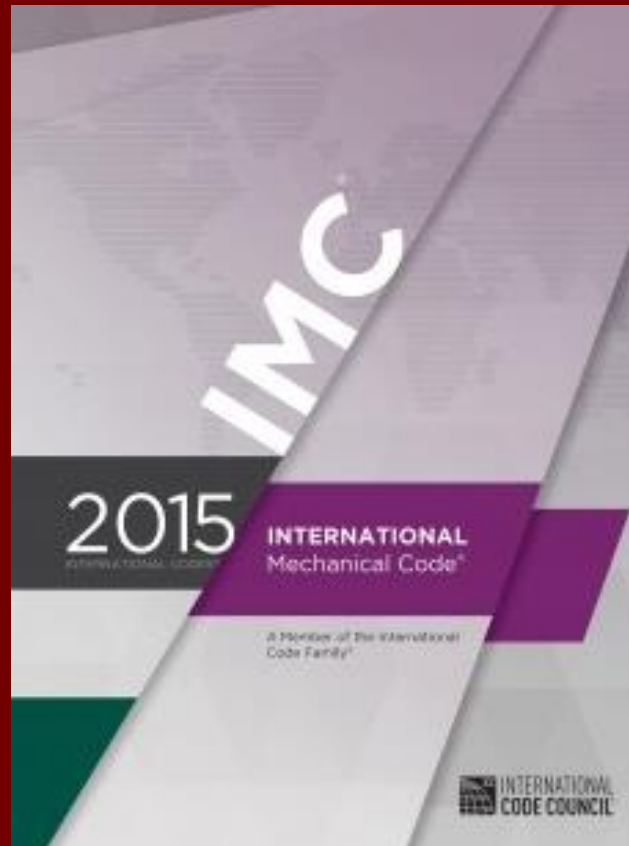
Industry Services Division

Dept. of Safety & Professional Services

Randy Dahmen, PE

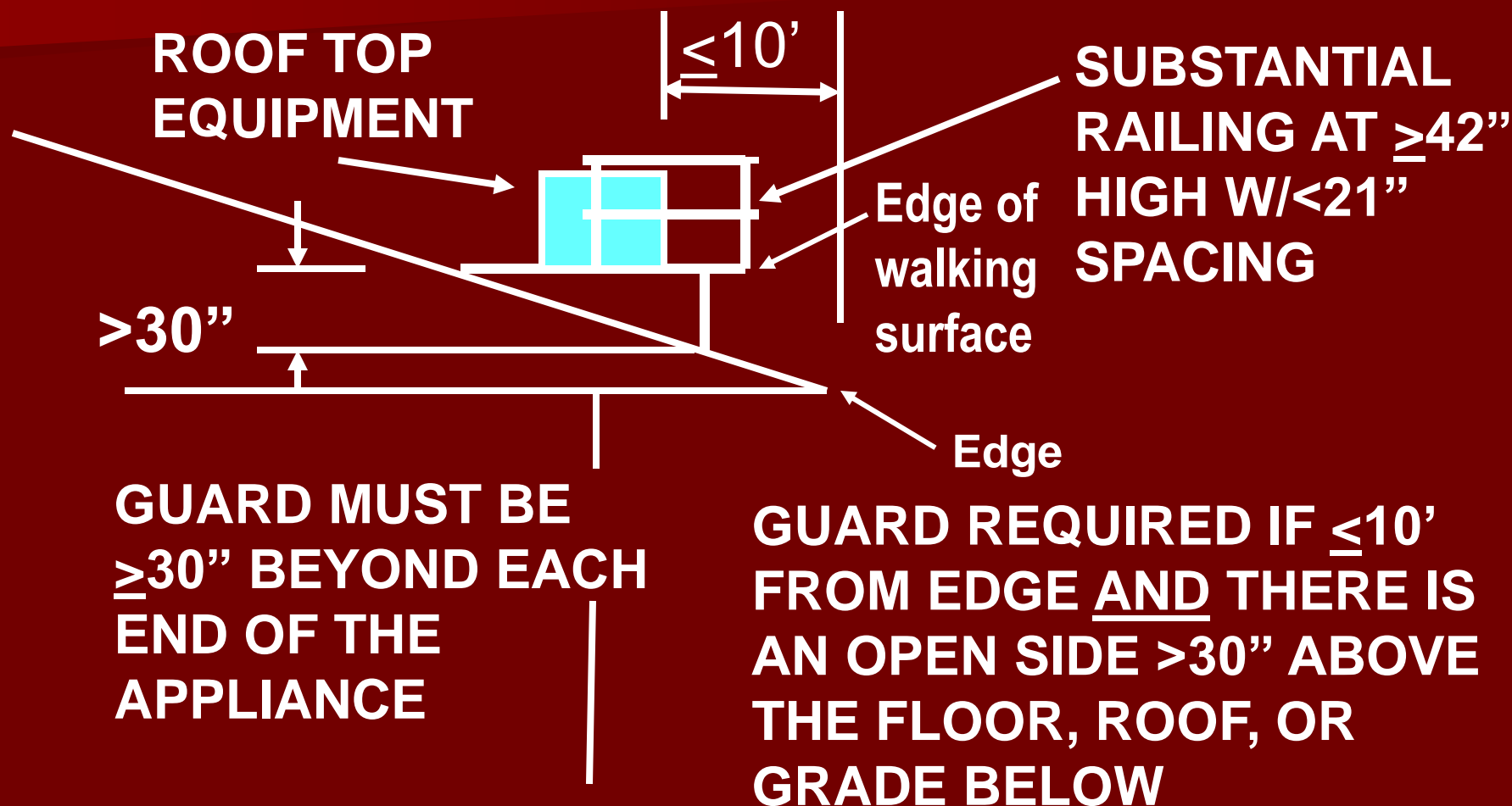


- The following discussion addresses changes to various topics as contained in the 2015 IMC & WI amendments as contained in SPS Chapter 364



HVAC Equipment & Roof Hatch Guards

IMC 304.11, 306.5, IBC 1009.11, 1013, 1607.7.1, IFGC 306.6



HVAC Equipment & Roof Hatch Guards IMC 304.11



Fall-Arresting Restraint System

IMC 304.11

- Guards not req'd where permanent fall arrest/restraint anchorage connector devices are affixed for use during the entire roof conveying lifetime.
- Devices to be placed ≤ 10 ft on center along hip & ridge lines; as well ≤ 10 ft from roof edge or open side of walking surface.

Fall-Arresting Restraint System

IMC 304.11



Sloped Roof-Equipment Req't

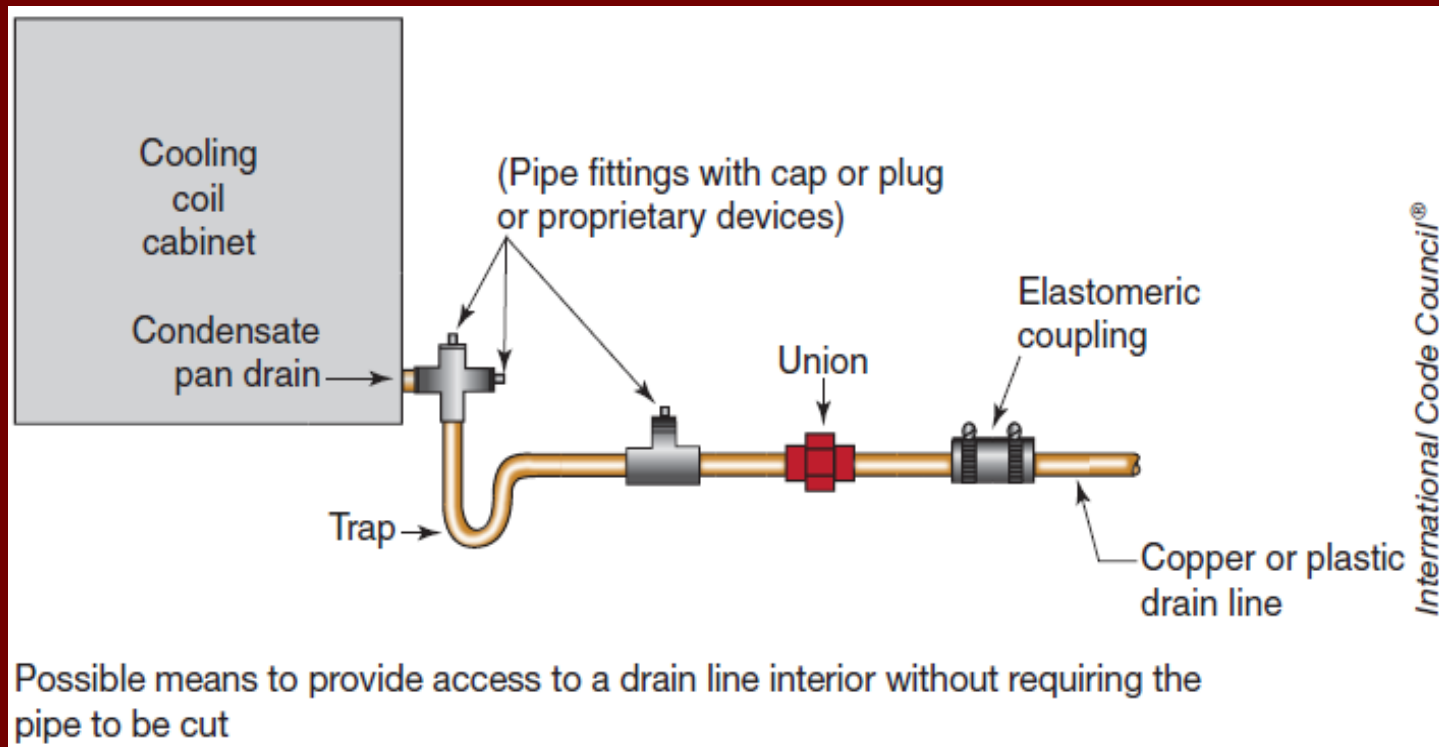
Amendment Removal from IMC 306.5.1

- Removal of amendment now requires installation of guards & platforms when installations consist of fans only.
 - If the roof is $\geq 3/12$
 - Install guards if $> 30''$ at each edge
 - Install platform with not less than $30''$ clearance in any dimension
 - *This is an important issue when addressing upblast fans associated with kitchen exhaust systems*

Drain Line Maintenance

IMC 307.2.5

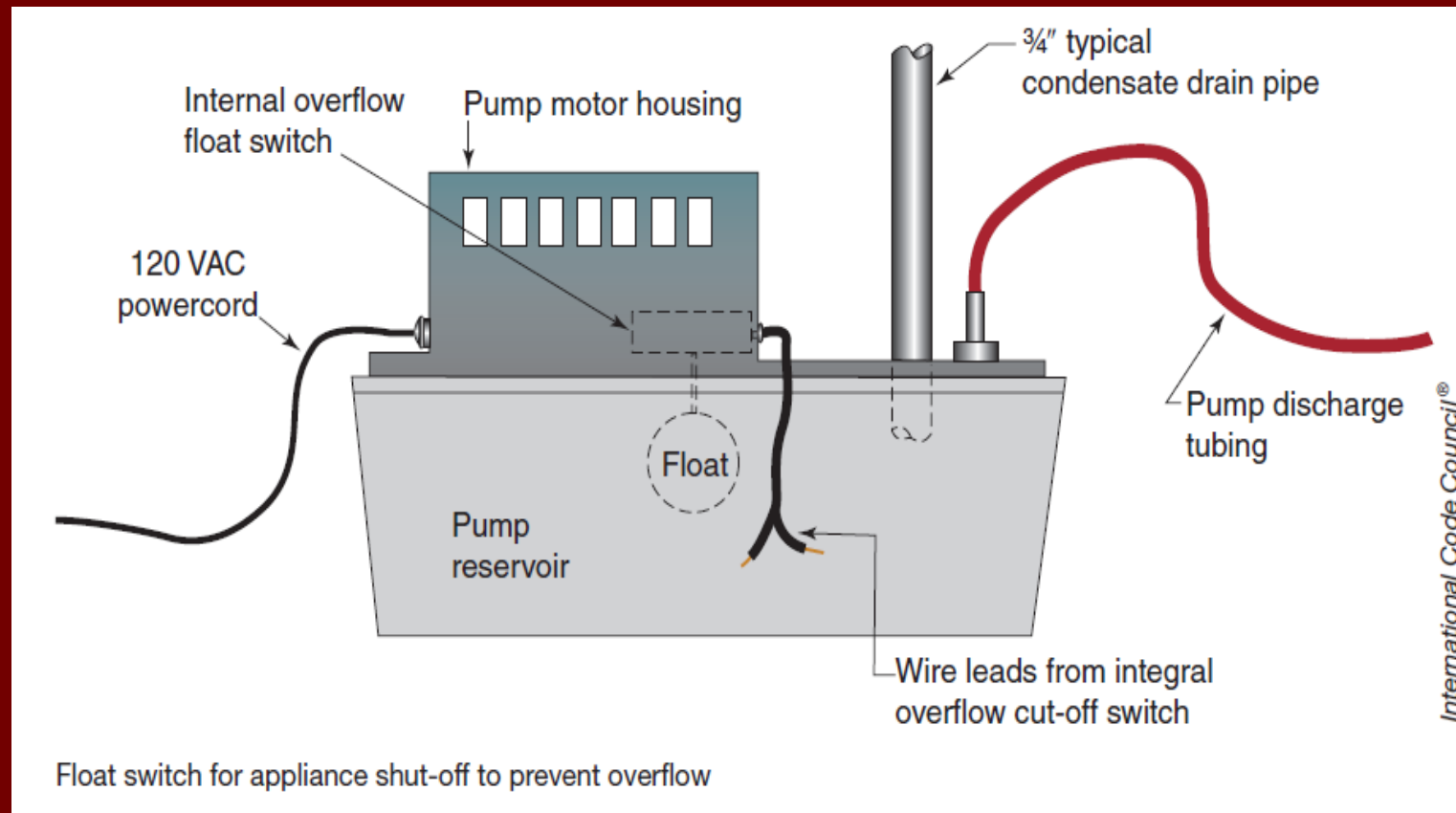
- Condensate drain lines shall be configured to permit the clearing of blockages and performance of maintenance without requiring the drain line to be cut.



Condensate Pumps in Uninhabitable Spaces IMC 307.3

- Condensate pumps in attics & crawl spaces to be connected to appliance or equipment served such that when the pump fails, the appliance or equipment will be prevented from operating.
- Pumps to be installed per manufacturer's instructions.

The majority of such pumps are equipped with simple float controls that can be wired in series with the appliance/equipment control circuit. When the pump system fails, the float will rise in the reservoir and open a switch before the condensate starts to overflow the reservoir.



Ventilation Required

IMC 401.2/ SPS 364.0401

- WI amendment removes need to determine if dwelling unit has air infiltration rate < 5 air changes, and still allows the use of natural ventilation for all R-2, R-3 & R-4

Intake Opening Locations

SPS 364.0401(4)(e)

- Intake openings shall be located a minimum of 10 ft from lot lines or buildings on the same lot.
- *Where openings front on a street or public way, the distance shall be measured to the centerline of the street or public way.*

SPS Table 364.0403 Changes

Occupancy Classification	Estimated Maximum Occupant Load (persons per 1,000 sq. ft.)	Exhaust ^c (cfm/net sq. ft. floor area)	Common Ventilation System Alternative – Minimum AC Rate per Hour with A/C
Health care facilities			
Hospitals	See s. SPS 364.0300	See s. SPS 364.0300	See s. SPS 364.0300
Nursing homes	<u>See s. SPS 364.0300</u>	<u>See s. SPS 364.0300</u>	<u>See s. SPS 364.0300</u>
Outpatient surgical facilities	<u>See s. SPS 364.0300</u>	<u>See s. SPS 364.0300</u>	<u>See s. SPS 364.0300</u>

SPS Table 364.0403 Changes

Occupancy Classification	Estimated Maximum Occupant Load (persons per 1,000 sq. ft.)	Exhaust ^c (cfm/net sq. ft. floor area)	Common Ventilation System Alternative – Minimum AC Rate per Hour with A/C
and dorms			
Assembly rooms	120	NR	2.0
Bathrooms <u>for guest rooms</u> ^{c, d}	NA	35 cfm/room	NR
Bedroom	footnote f	NR	1.0
Conference rooms	50	NR	2.0
Dormitory sleeping areas	20	NR	1.0
	NA	2.0	NR
Casinos	footnote f	NR	1.0
Living rooms	30	NR	2.0
Lobbies			

SPS Table 364.0403 Changes

Occupancy Classification	Estimated Maximum Occupant Load (persons per 1,000 sq. ft.)	Exhaust ^c (cfm/net sq. ft. floor area)	Common Ventilation System Alternative – Minimum AC Rate per Hour with A/C
Platforms	100	NR	2.0
Waiting rooms	100	NR	2.0
<u>Aircraft hangars (for 2 or more aircraft or any hanger with adjacent occupancies)</u>	<u>NA</u>	<u>0.5</u>	<u>NR</u>

SPS Table 364.0403 Changes

Occupancy Classification	Estimated Maximum Occupant Load (persons per 1,000 sq. ft.)	Exhaust ^c (cfm/net sq. ft. floor area)	Common Ventilation System Alternative – Minimum AC Rate per Hour with A/C
Locker and dressing rooms ^c	NA	0.5	NR
Shower rooms (<u>per shower head</u>)	NA	<u>50 cfm</u> <u>intermittent or</u> <u>20 cfm</u> <u>continuous</u>	NR
Toilet rooms ^{c, d}	NA	75 cfm/TF ^g	NR

Occupancy Classification	Estimated Maximum Occupant Load (persons per 1,000 sq. ft.)	Exhaust ^c (cfm/net sq. ft. floor area)	Common Ventilation System Alternative – Minimum AC Rate per Hour with A/C
Automotive service and repair garages <u>for gasoline or diesel fueled vehicles</u> ^{ckl.}	NA	0.5	NR
Barber shops	25	NR	1.0
Beauty Salons <u>salons</u> ^h	NA	0.5	NR
Car washes	NA	NR	NR
Clothier, furniture specialty shops	8	NR	1.0
Florist shops	8	NR	1.0
Hardware, drugs, fabrics stores	8	NR	1.0
Nail salons ^m	NA	0.6	NR
Supermarkets	8	NR	1.0

← So as to differentiate from CNG req'ts in IMC 502.16

Enclosed Parking Garage

SPS Table 364.0403 Footnote i

- Enclosed parking garages are parking garages ~~with less than 30% open areas in the total wall area enclosing the garage~~ that fail to meet the criteria for open garages in IBC section 406.5.2.
- Ventilation systems in enclosed parking garages shall comply with IMC section ~~404~~ 502.13.

Enclosed Parking Garage

SPS Table 364.0403 Footnote I, IMC 502.13

- A mechanical ventilation system is not required if the room or space meets all of the following:
 - 1. Has a floor area of ≤ 850 sf
 - 2. Is used for the storage of ≤ 5 or fewer motorized vehicles, and
 - *3. The space meets the natural ventilation requirements of IMC 402 & s. SPS 364.0402.*

Enclosed Parking Garage

SPS Table 364.0403 Footnote i

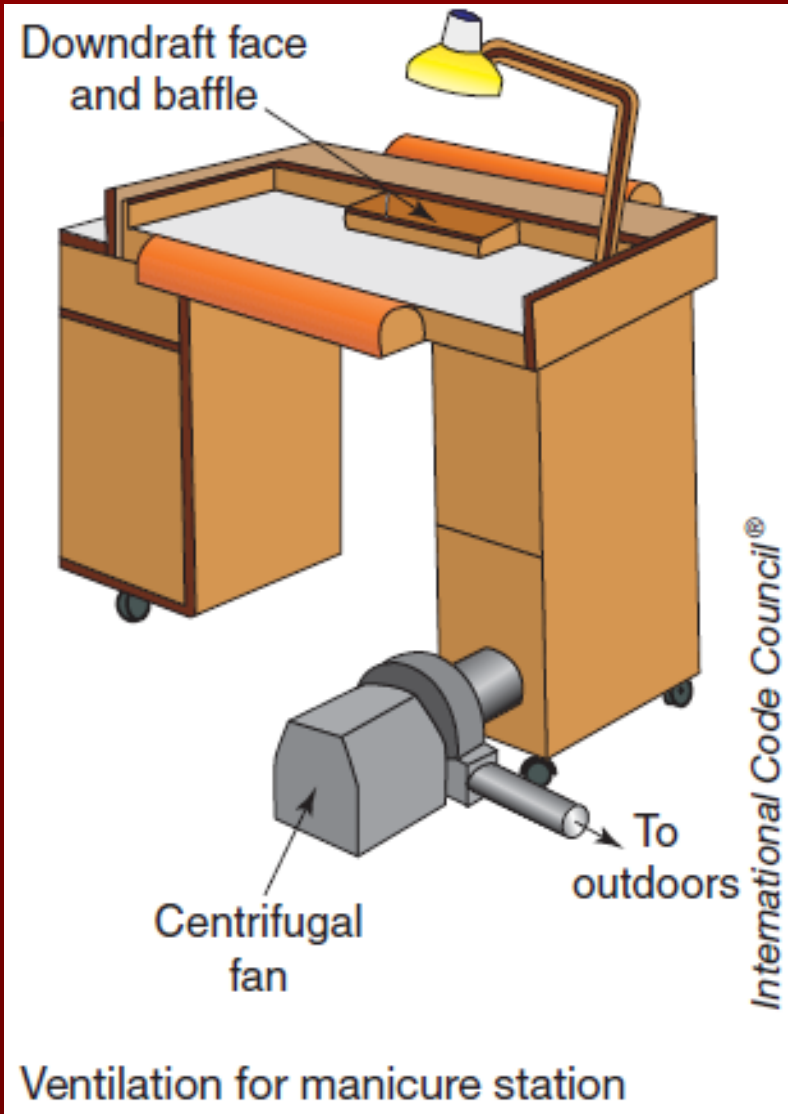
- The requirements for enclosed parking garages shall apply to all buildings, or parts of buildings, *into which motor vehicles are driven for loading, unloading, or storage.*

Automotive Service and Repair Garages for Gasoline or Diesel Fueled Vehicles

SPS Table 364.0403 Footnotes k & l

- For Compressed Natural Gas (CNG), refer to IMC 502.16
- Mezzanine floor areas that are open to a service and/or repair area may not be included as floor area when determining the minimum exhaust rate from the room or space

Manicure & Pedicure Station Exhaust Rate SPS Table 364.0403 Footnote m



- For nail salons, the exhaust system shall be capable of exhausting the greater of 50 cfm per station or 0.6 cfm per square foot of work area.

Manicure & Pedicure Station Exhaust Rate SPS Table 364.0403 Footnote m

- The exhaust inlet shall be located in the work area.

Manicure & Pedicure Station Exhaust Rate SPS Table 364.0403, 502.20



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Pedicure station

Manicure & Pedicure Station Exhaust Rate IMC 502.20/IMC 502.1.1

- Because there is no reference from IMC 502.20 to SPS Table 364.0403, it's application is not valid.
- *The need for tables or stations not provided w/factory-installed exhaust inlets, to have exhaust inlets located \leq 12" horizontally & vertically from the point of chemical application has been removed.*

Manicure & Pedicure Station Exhaust Rate SPS Table 364.0403, 502.20



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Air Change Exception

SPS 364.0403(5)(d)2.

- Air change rate of less than 6 air changes per hour is permitted where mechanical cooling is provided to maintain an interior design temperature of ~~78°F~~ 75°F or lower.
 - *This allows for consistency between IECC C302.1 & R302.1; and SPS 364.0403(5)(d)2.*

Air Change Exception

SPS 364.0403(5)(d)2.e.

- The air change requirement for 6 air changes per hour may be omitted in any of the following applications:
 - 1. Bldgs or rooms using spot heating as ONLY source of heat.
 - 2. Bldgs where outside air is waived
 - 3. Bldg utilizing natural ventilation per IMC 402

Intermittent Operation of Mechanical Systems for Enclosed Parking Garages

SPS 364.0404(1)

■ Option 1

- System to continuously exhaust @ min. of 0.05 cfm/sf
- System to operate at a min. of 0.75/cfm/sf automatically upon detection of vehicle operation, the presence of occupants...
- Must also be automatically controlled for intermittent operation for minimum 0.75 cfm/sf exhausts utilizing both CO & NO₂ detectors

Intermittent Operation of Mechanical Systems for Enclosed Parking Garages

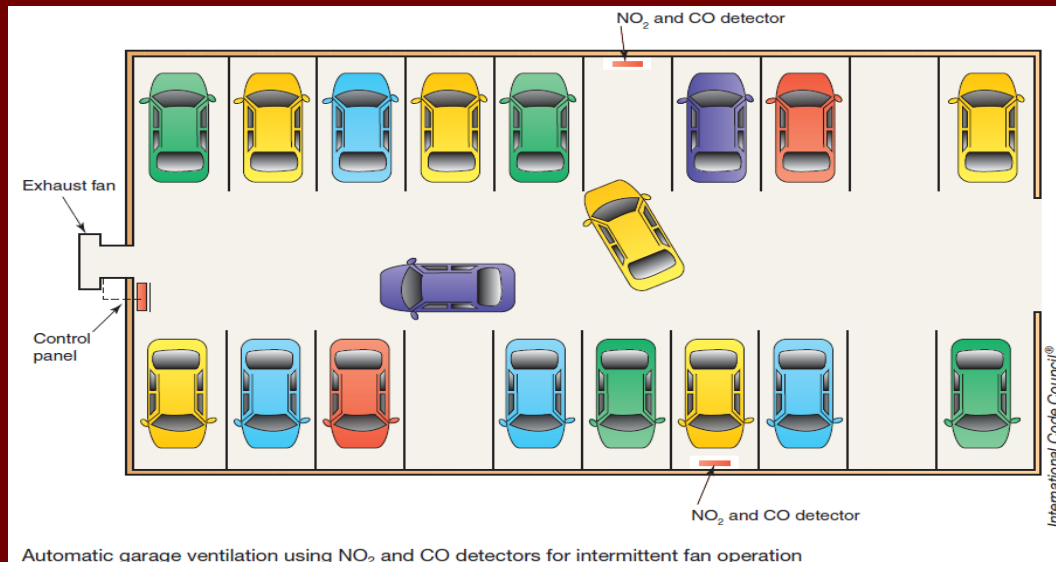
SPS 364.0404(1)

■ Option 2

- System to be arranged to operate intermittently for a total of least 5 hrs in each 24 hour period at a minimum rate of 0.75 cfm/sf and shall also include the installation of CO & NO₂ sensors as appropriate

Intermittent Operation of Mechanical Systems for Enclosed Parking Garages SPS 364.0404(2)

- All systems to operate automatically upon detection of:
 - $\text{CO} > 35$ parts per million (ppm)
 - $\text{NO}_2 > 1$ part per million (ppm) if diesel-fueled vehicles are stored



Ventilation-Ambulatory Care Facilities

IMC 407.1

- Ambulatory Care Facilities & Group I-2 occupancies to be designed and installed in accordance with this code & ASHRAE 170.



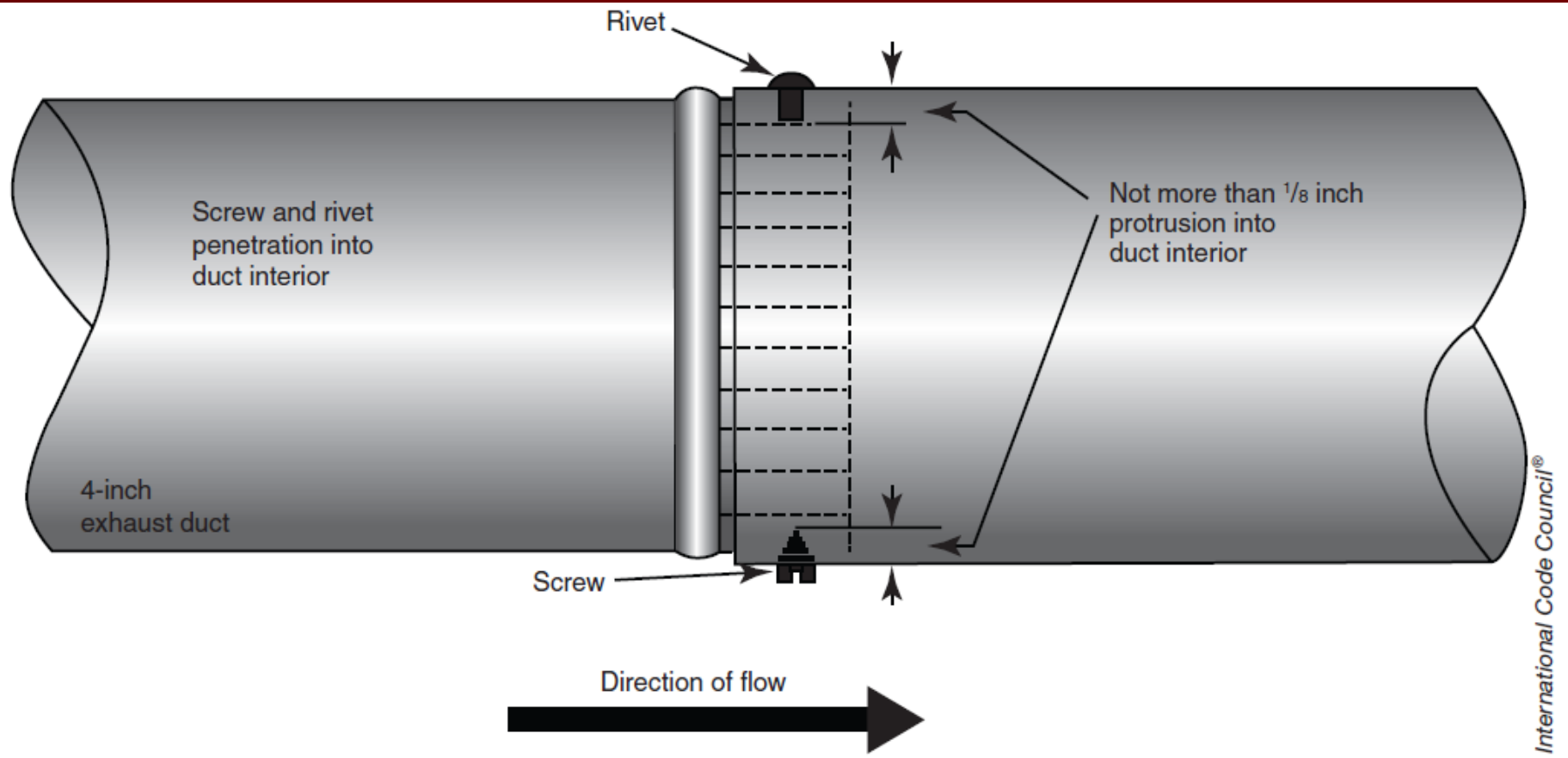
Clothes Dryer Exhaust Duct Installation

IMC 504.8.2

- Ducts shall not be joined w/screws or similar fasteners that protrude more than 1/8" into the inside of the duct.
- A fastener protrusion of $\leq 1/8"$ or less will collect some lint, but it is insignificant.
 - Listed duct tape is not allowed to be depended upon as the sole means of securing duct systems because it is a sealing means not a fastening means.

Dryer Exhaust Duct Installation

IMC 504.8.2



Dryer Exhaust Duct Power Ventilators

IMC 504.5 & 504.8.4.3

- The maximum length of the exhaust duct shall be determined by the dryer exhaust duct power ventilator manufacturer's installation instructions.
- *Such systems were not previously recognized. This will help in addressing extended dryer exhaust duct lengths*

Dryer Exhaust Duct Power Ventilators

IMC 504.8.4.3



Dryer exhaust duct power ventilator

Dryer Exhaust Duct Power Ventilators

IMC 504.5 & 504.8.4.3

- Domestic units to be listed & labeled to UL 705 for use in dryer exhaust duct systems.
- The dryer exhaust duct power ventilator shall be installed in accordance with the manufacturer's instructions.

Domestic Range Hoods

IMC 505.1, 505.4, SPS 364.0505

- The requirements of IMC 505.4 are not included as part of Chs SPS 361 to 366
- *The rule required those occupancies, other than Group R, be provided with domestic range hoods where domestic cooking appliances are utilized*

Grease Duct Test

IMC 506.3.2.5

- Prior to the use of concealment of any portion of a grease duct system, a leakage test shall be performed
- Ducts are considered concealed where installed in shafts or covered by coatings or wraps that prevent the ductwork from being visually inspected on all sides.

Grease Duct Test

IMC 506.3.2.5

- The “permit holder” (Contractor) shall be responsible to provide the necessary equipment and perform the grease duct leakage test.
- A light test shall be performed to determine that all welded & brazed joints are liquid tight.

Grease Duct Test

IMC 506.3.2.5

- A light test shall be performed by passing a lamp having a power rating > 100 watts through the entire section of ductwork to be tested.
- For listed factory built grease ducts, this test shall be limited to duct joints assembled in the field & shall exclude factory welds.

Type I Commercial Hood Grease Duct Reservoirs IMC 506.3.7.1

- Grease duct reservoirs shall be:
 - Constructed for the grease duct they serve
 - Be located on the bottom of the horizontal duct or the bottommost section of the duct riser.
 - Extend across the full width of the duct & have a length of $\geq 12''$
 - Have a depth of not less than 1"
 - Have a bottom that slopes to a drain (ie. drain must be provided)

Grease Duct Reservoir

IMC 506.3.7.1 (cont.)

- Be provided with cleanout opening per 506.3.8 installed to provide access to the reservoir. The cleanout opening shall be located on a side or on top of the duct so as to permit cleaning of the reservoir.
- Be installed per manufacturer's instructions where such listed devices are utilized



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- Grease duct reservoir with drain



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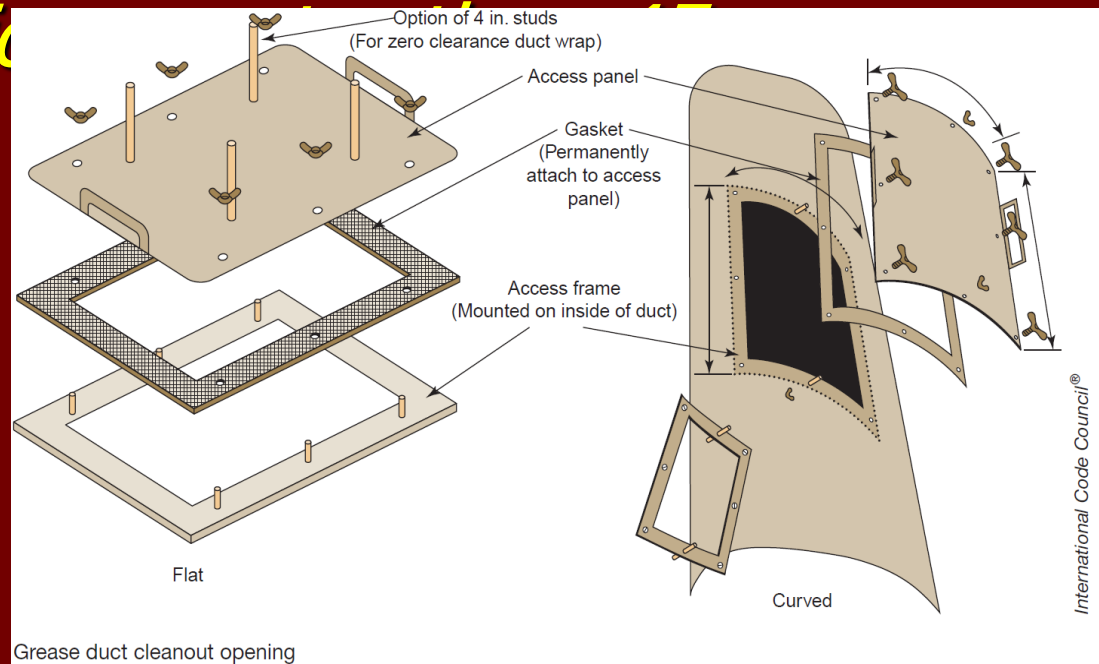
There's nothing like a coffee can for use
in collecting grease....nothing...



Grease Duct Cleanouts & Openings

IMC 506.3.8

- Sections of grease duct that are inaccessible from the hood or discharge openings shall be provided with cleanout openings ≤ 20 ft apart *& ≤ 10 ft from changes in direction*



Grease Duct Cleanouts & Openings

IMC 506.3.8

- Cleanouts & openings to be equipped w/tight fitting doors constructed of steel of thickness no less than req'd by duct
- Cleanout doors to be liquid tight
- Door assemblies including any frames and gaskets
- Gasket & sealing materials to be rated for Minimum 1,500°F
- Install listed door per instructions

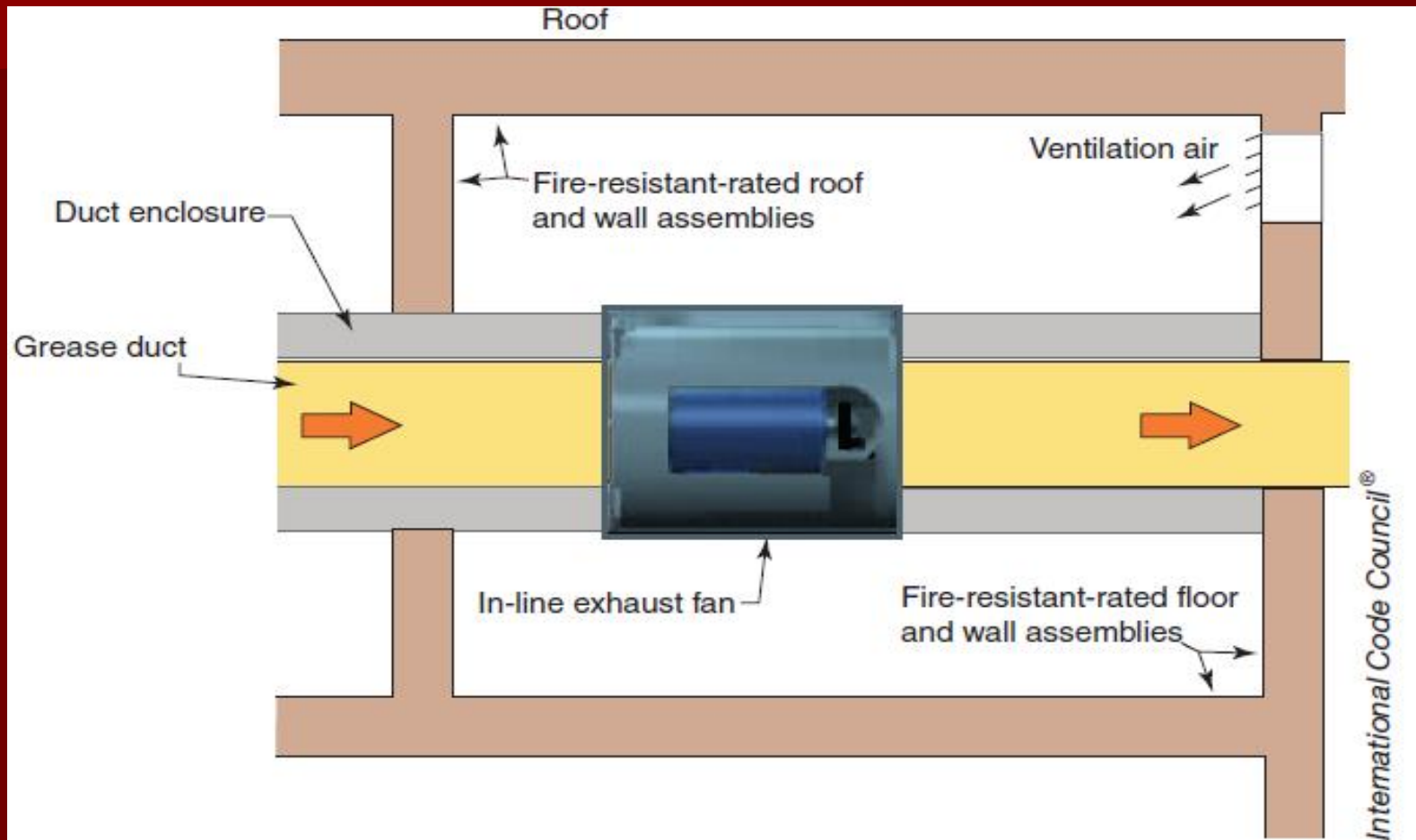
In-line Fan Location

IMC 506.5.1.2

- Where enclosed duct systems are connected to in-line fans not located outdoors, the fan shall be located in a room or space having the same fire resistance rating as the duct enclosure.

In-Line Fan Location in Exhaust Ducts Serving Commercial Kitchen Hoods

IMC 506.5.1.2



An in-line fan must be located in a room or space having the same fire-resistance rating as the grease-duct enclosure.

In-line Fan Location

IMC 506.5.1.2

- Access shall be provided for servicing and cleaning of fan components.
- Such rooms or spaces shall be ventilated in accordance with the fan manufacturer's installation instructions.



Really??



Exhaust Fan Mounting

IMC 506.5.3

- Up-blast fans serving *type I hoods* & installed in a vertical *OR horizontal position* shall be hinged, supplied with a flexible weather proof electrical cable to permit inspection *and cleaning and shall be equipped with a means of restraint to limit the swing of the fan on its hinge.* The ductwork shall extend not less than 18"

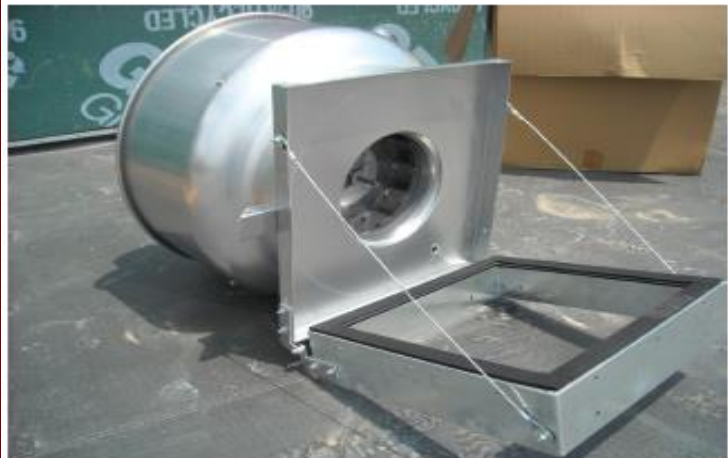
Hinged Up-Blast Fans

IMC 506.5.3



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Hinged up-blast fan for Type I hood exhaust



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Restraint cable for hinged exhaust fan

- The code now requires that *vertical & horizontal hinged exhaust fans* be provided with a means to limit the travel of the fan assembly on its hinges to prevent injury to personnel & damage to the building & fan.

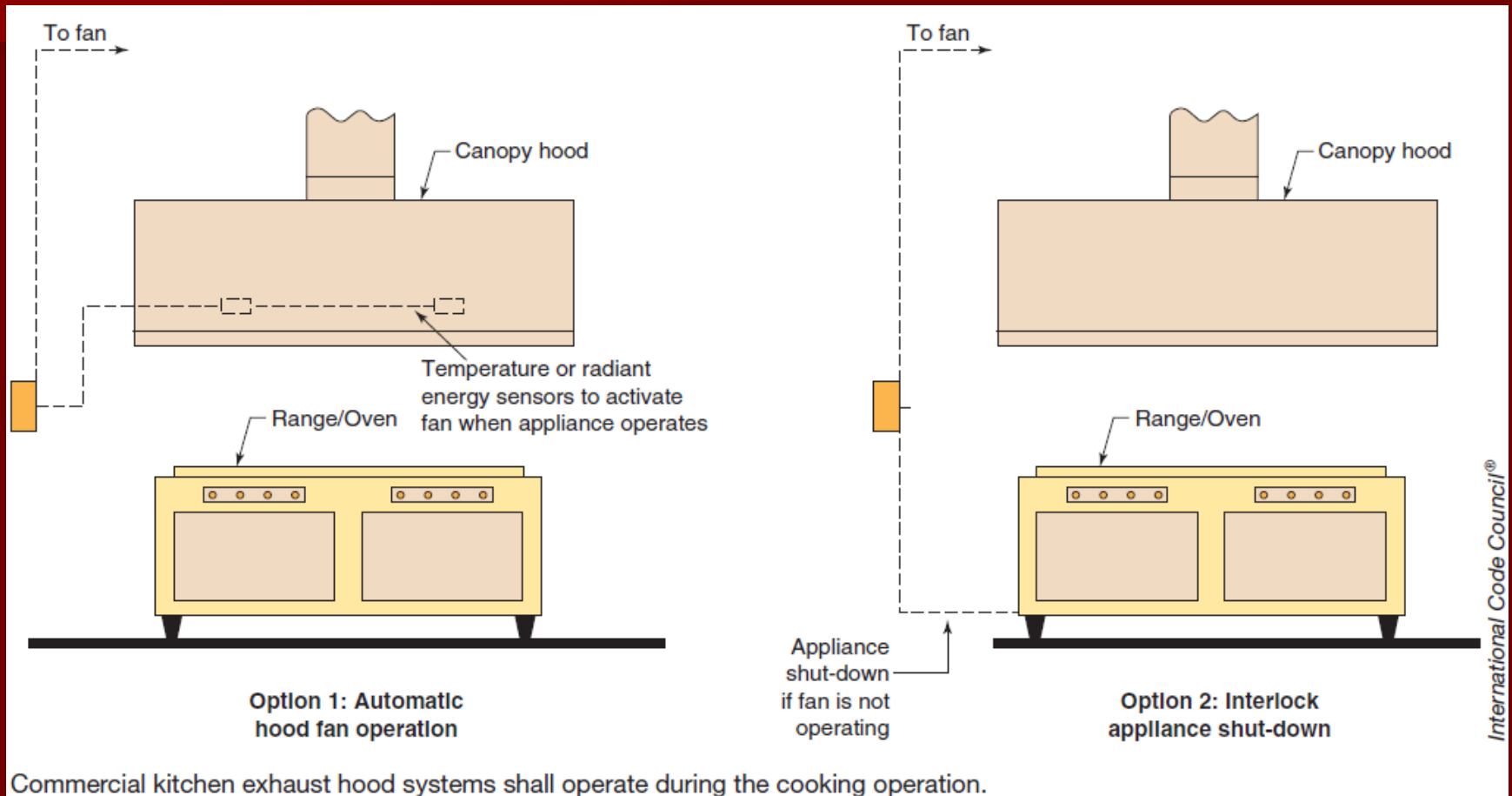
Type I Hood Installation

IMC 507.1

- Interlock required on Type I hoods to prevent operation when the exhaust fan is NOT turned on
- Where >1 sensors are installed, the fan is to activate for ≤ 15 minutes after the first appliance served by the hood, has been turned on.

Type I Hood Installation

IMC 507.1



Type I Hood Installation

IMC 507.1

- Type I or II hood to be installed above commercial cooking appliances.
- Where any cooking appliance located under a single hood req'rs a type I hood, a type I hood shall be used.
- Where a type II hood is req'd, type I or II to be installed
- Where type I hood is installed, the installation of entire systems shall comply with type I hood.

Commercial Kitchen Exhaust Hood Systems

IMC 507.1.1

- The exhaust fan serving a Type I hood to have a automatic controls which activate the fan when any appliances requiring a type I hood is turned on, or a means of interlock shall be provided that will prevent operation of such appliances when the exhaust fan is not turned on.

Type I Hood Operation

IMC 507.1.1

- Net exhaust volumes permitted to be reduced during part-load cooking conditions, where engineered or listed multi-speed or variable speed controls automatically operate the exhaust system.

Commercial Kitchen Exhaust Hood Systems IMC 507.1.1

- Where 1 or more temperature or radiant energy sensors are used to activate a Type I hood exhaust fan, the fan shall activate ≤ 15 minutes after the first appliance served by that hood has been turned on.

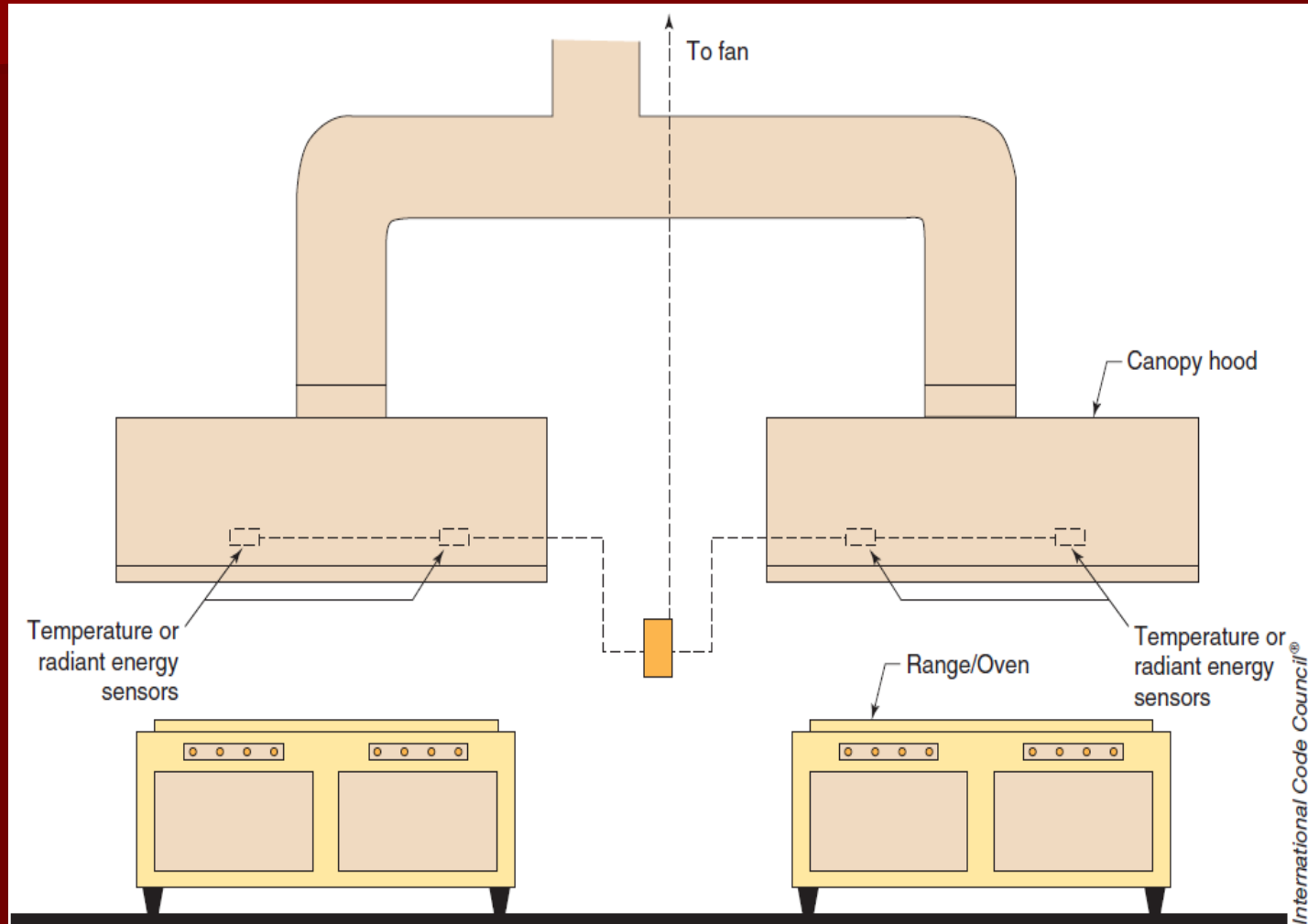
Heat Sensors for Multiple Commercial Kitchen Hoods

IMC 507.1.1.1/SPS 364.0507(3)

- The requirements in IMC 507.1.1.1 are not included.
- *This section required that where heat or radiant energy sensors are utilized in hood systems consisting of multiple hoods served by a single exhaust system, such sensors shall be provided in each hood.*

Heat Sensors for Multiple Commercial Kitchen Hoods

IMC 507.1.1.1

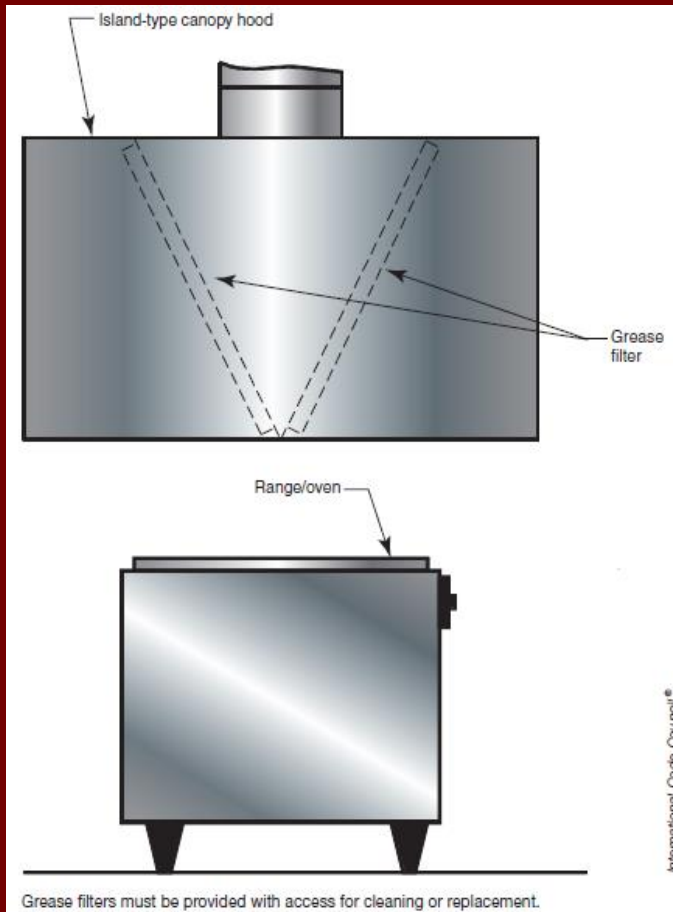


Sensors for automatic operation must be located in each hood served by a common exhaust system.

Type I Hood Grease Filters

IMC 507.2.8.1

- The code recognizes the use of disposable grease filters



Dishwashing Appliances

IMC 507.5.5

- A Wisconsin amendment was removed
- The minimum net airflow for Type II hoods used for dishwashing appliances shall be 100 cfm/linear ft of hood length
 - Exception: Dishwashing appliances and equipment installed in accordance with IMC 507.3

Domestic Range Hoods

IBC 904.13

- The 2015 IBC & IFC require domestic cooking hoods in I-2 occupancies to be equipped with an automatic fire extinguishing system recognized for protection of domestic cooking equipment & requires a manual activation device.
- K-Type fire extinguisher to be within 30 ft of domestic cooking equipment .

Air Balance for Commercial Kitchen Ventilation Systems

IMC 508.1.2

- The design outdoor air balance shall indicate all exhaust & replacement air for the facility, plus the net exfiltration if applicable.
- Total replacement air airflow =
Total exhaust airflow rate + net exfiltration

It is requested that designer's address on all Kitchen Hood Plans

Air Balance for Commercial Kitchen Ventilation Systems

IMC 508.1.2

- 1,400 cfm hood A
- 1,225 cfm hood B
- 300 cfm toilet exhausts
- 75 cfm janitor room
- Total Exhaust
– 3,000 cfm
- 2,200 cfm make- up air
- 800 O.A. for ventilation
- Total Outside Air
– 3,000 cfm

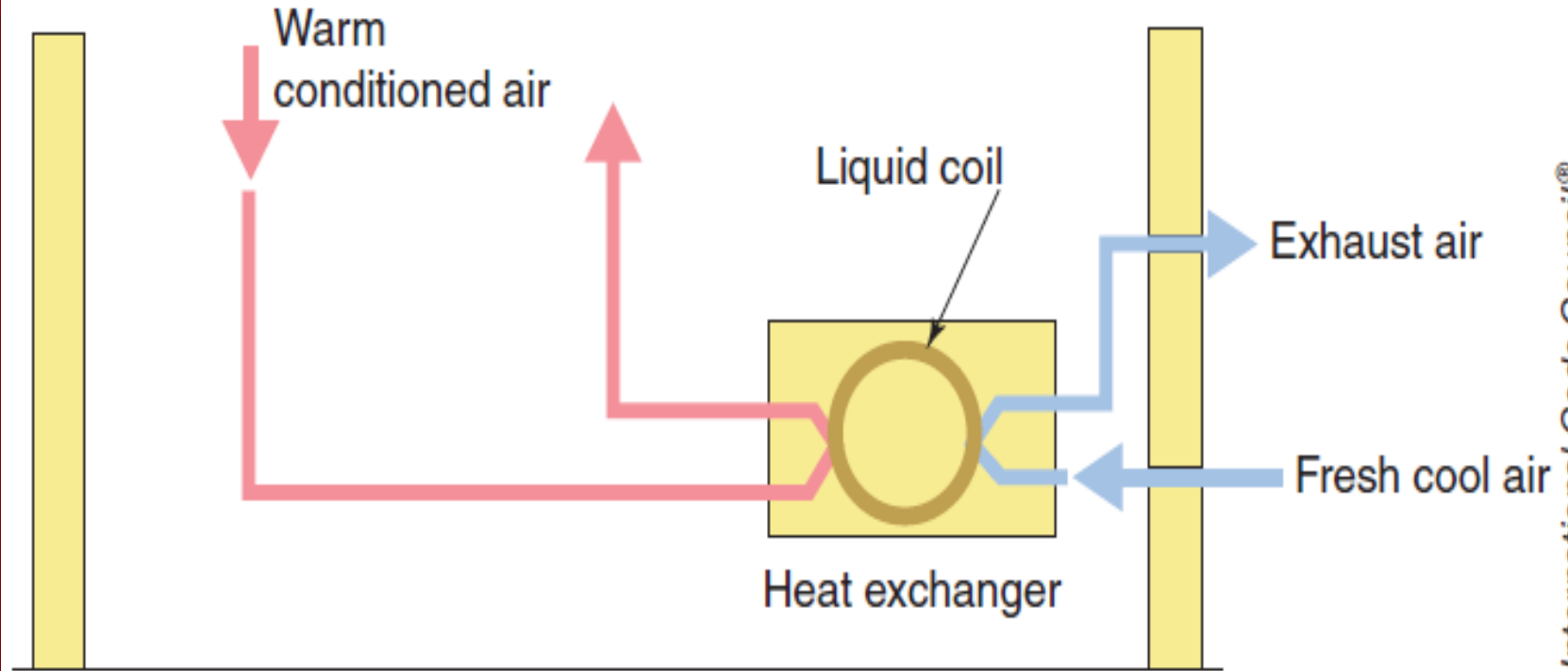
Energy Recovery Ventilation Systems

IMC 514.2

- Prohibited applications now given an exception
- Exception: The application of ERV equipment that recovers sensible heat only utilizing coil-type heat exchangers shall not be limited by this section.
- *Reason: The risk of cross-contamination is limited for this type of system*

Energy Recovery Ventilation Systems

IMC 514.2



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Energy recovery ventilation with coil-type heat exchangers is not limited in application by Section 514.2.

Return Air Openings

IMC 601.5

- Shall comply with:
 - Openings to be located <10 ft from an open combustion chamber or draft hood of another appliance in the same roof or space.
 - Return air not be taken from hazardous, insanitary location or refrigeration room
 - Amount of return air to be \leq flow rate of supply air from a room or space.
 - Return & transfer openings to be properly sized

Return Air Openings

IMC 601.5

- *Return air taken from one dwelling unit shall not be discharged into another dwelling unit.*
(now includes not only furnaces but roof-tops)
- Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace...

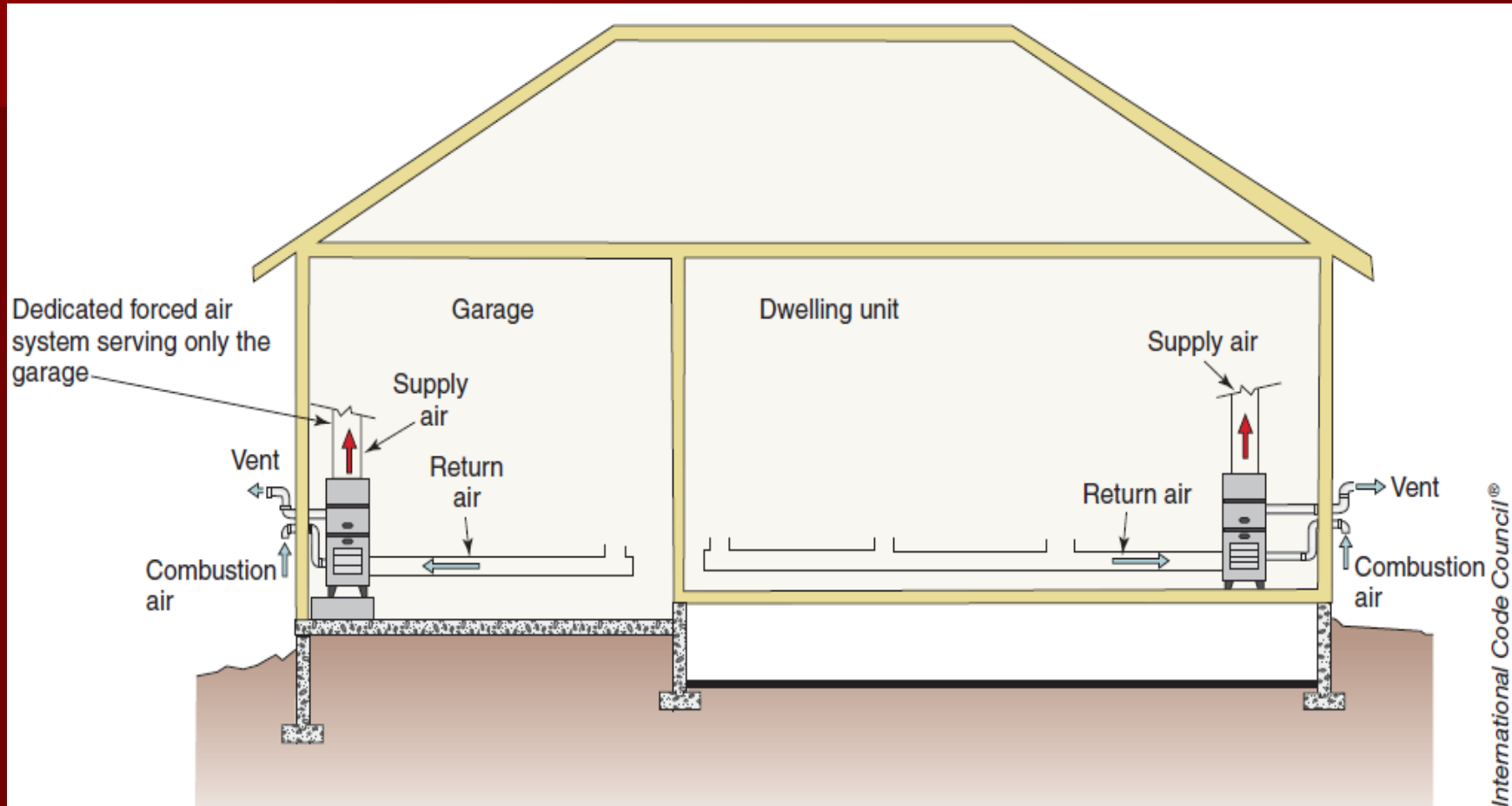


Return Air Openings

IMC 601.5

- Return air shall not be taken from closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic
- Exceptions
 - Taking return from a kitchen is not prohibited where return air openings are located ≥ 10 from the cooking appliance
 - Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage

Return Air Openings for a Dwelling Unit IMC 601.5



Furnaces and air handlers that serve a dwelling cannot also serve a garage and vice versa. Independent systems are required.

Plenums Limited to One Fire Area

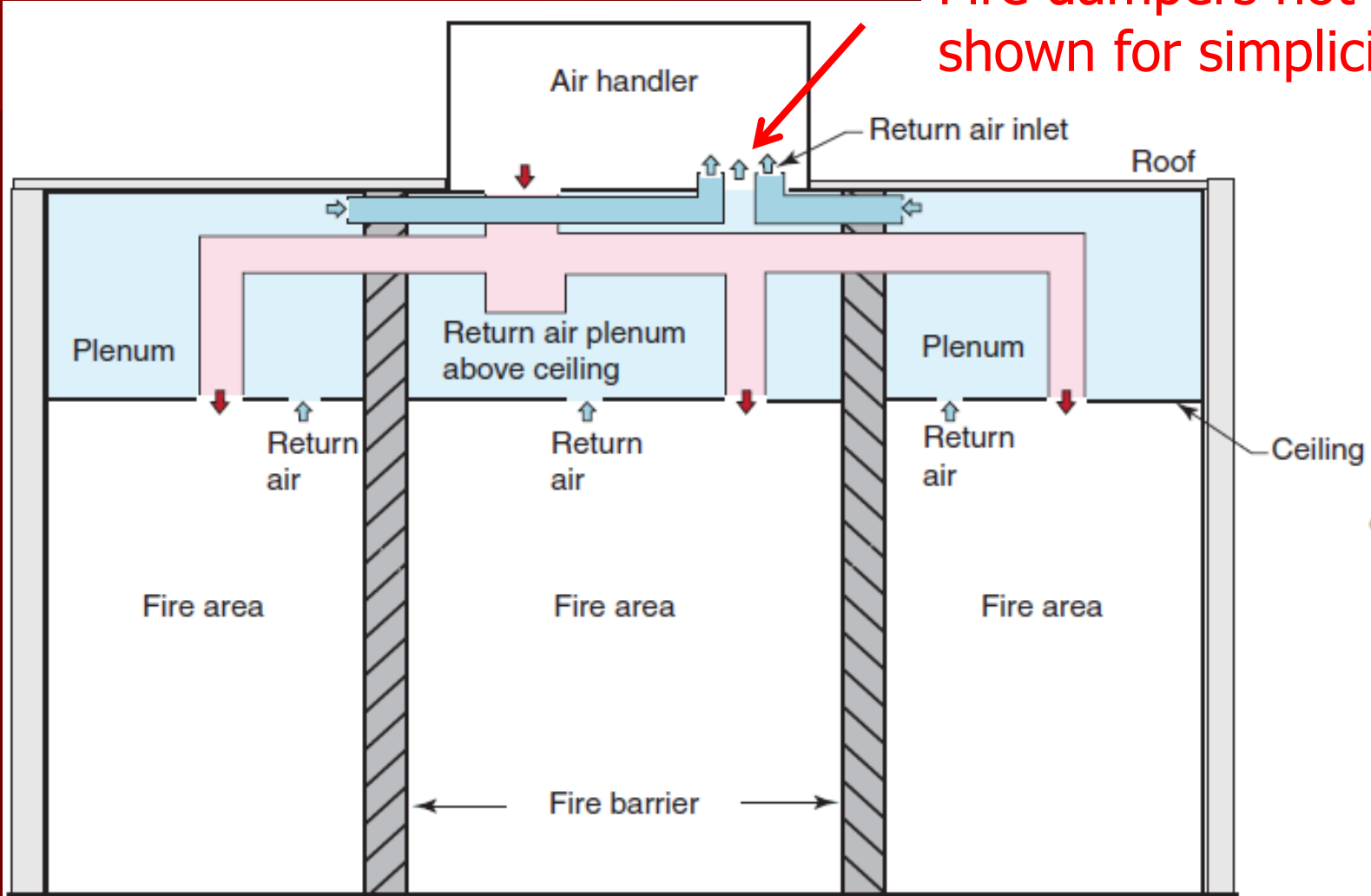
IMC 602.1

- "...Plenums shall be limited to one fire area."
- Air systems shall be ducted from the boundary of the fire area served directed to the air handling equipment.

Plenums Limited to One Fire Area

IMC 602.1

Fire dampers not shown for simplicity



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Plenums are limited to one fire area.

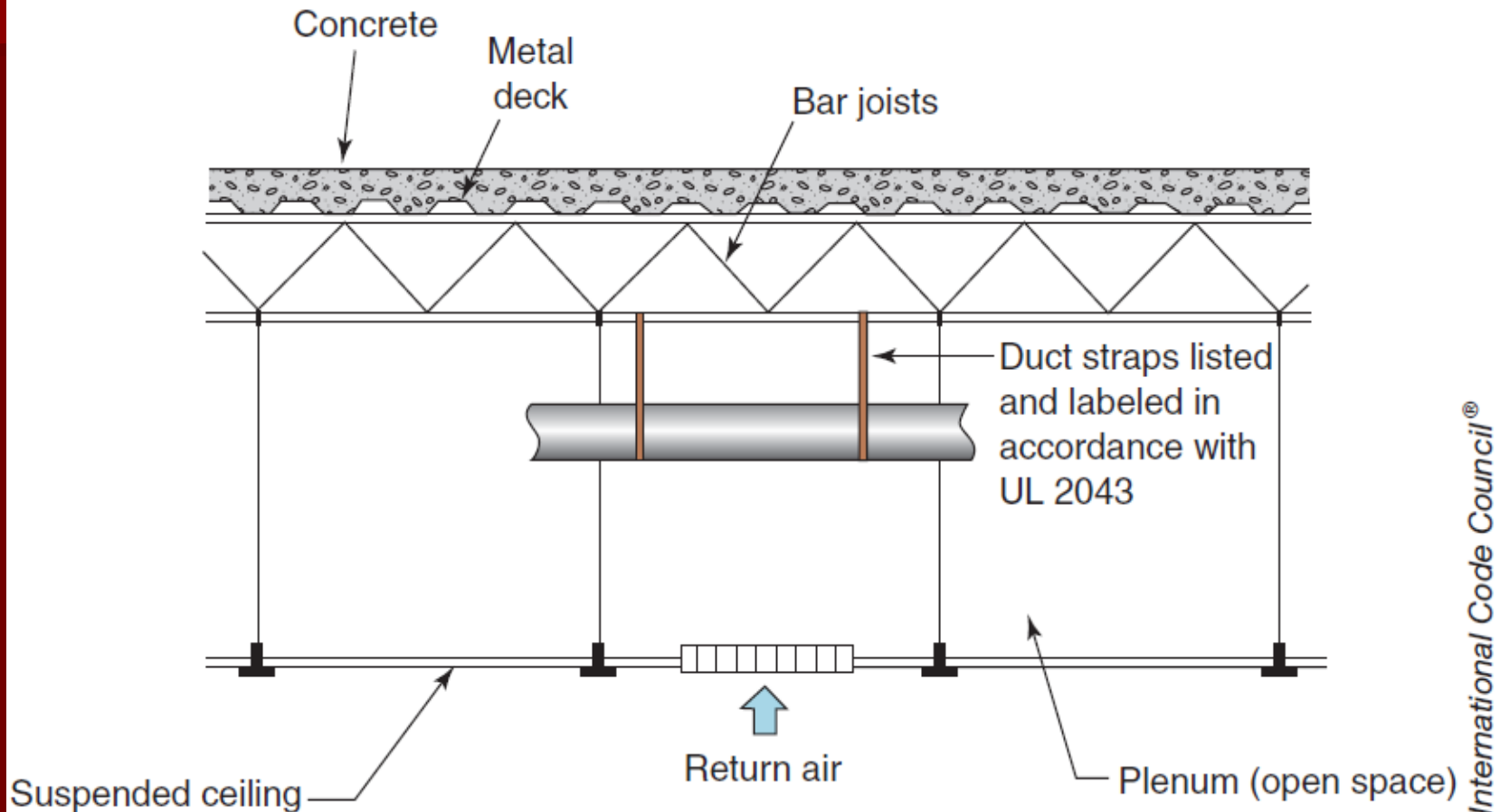
Discrete Plumbing & Mechanical Products in Plenums

IMC 602.2.1.5

- Discrete plumbing & mechanical products located a in plenum ... shall be listed for such use in accordance with UL 2043
- Discrete Product: Products that are non-continuous, individual, distinct pieces such as, but not limited to, electrical, plumbing, mechanical products & duct straps, duct fittings, duct registers & pipe hangers.

Discrete Plumbing & Mechanical Products in Plenums

IMC 602.2.1.5



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Discrete products approved for use in plenums

Duct Joints, Seams & Connections

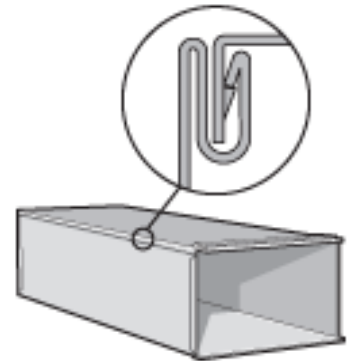
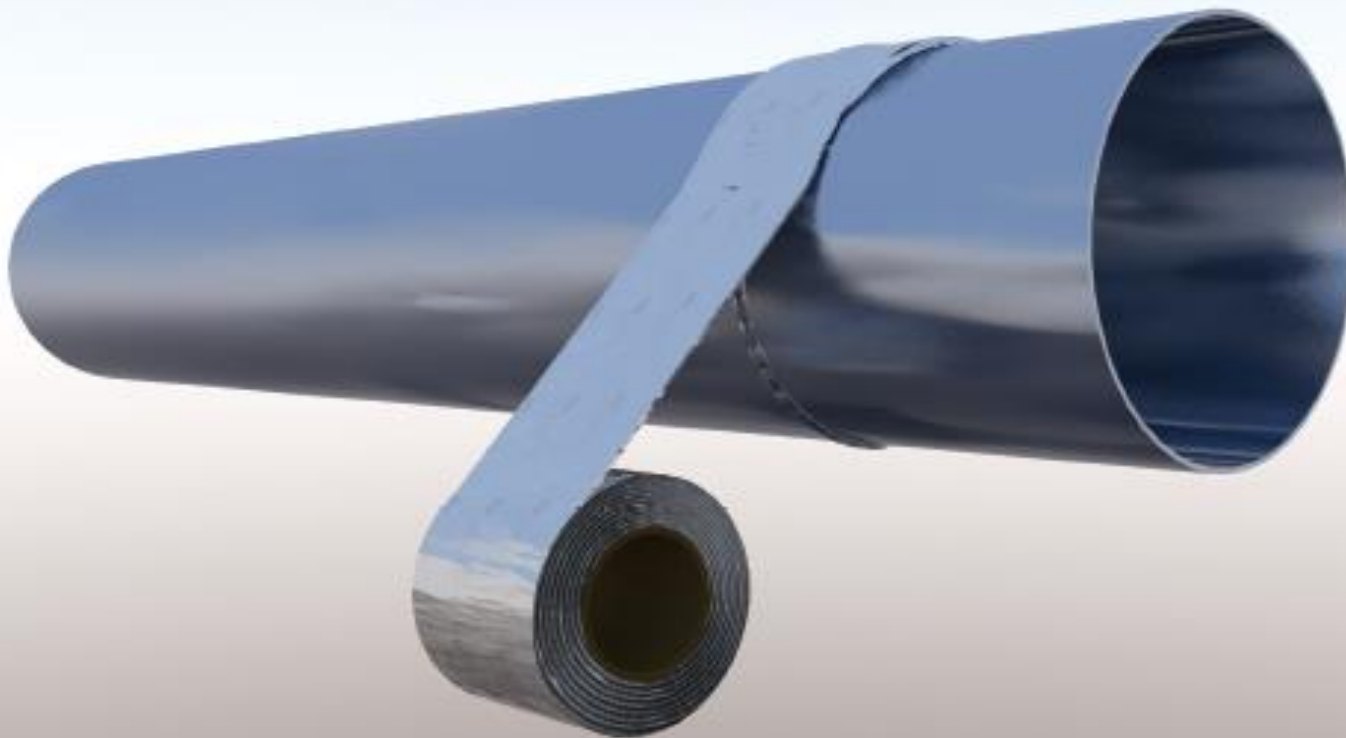
IMC 603.9

- Duct sealant tapes used on sheet-metal duct to be UL 181B
- Snap-lock and button-lock seams are no longer exempt from the sealing requirements.



Duct Joints, Seams & Connections

IMC 603.9



Button Lock Seam
Rectangular Button Lock
Duct in Lengths of 32", 48",
60", & 96"

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Tapes and mastics used to seal sheet-metal ducts must be listed to UL 181B.

Smoke Damper Activation

SPS 364.0607(1m) Exception

- Where listed ducted smoke detector is installed inside the duct or outside the duct with sampling tubes protruding into the duct in the supply air ductwork downstream of the air handling equipment, including air filters, & ahead of any branch ductwork; ...

Smoke Damper Activation

SPS 364.0607(1m) Exception

- ...and return air duct smoke detectors are installed inside the duct or outside the duct with sampling tubes protruding into the duct within 5 ft of each return air smoke damper, all supply and return smoke dampers shall be closed when any of the duct smoke detections in the supply or return air ducts are in alarm...

Smoke Damper Activation

SPS 364.0607(1m) Exception

- ...other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.

Non-Fire Resistance –Rated Floor Assemblies IMC 607.6.3/IBC 717.6.3

- Allowed to be protected as follows without a shaft:
 - In floor assemblies *composed of noncombustible materials*, a shaft shall not be required where the duct connects ≤ 3 stories, and the annular space around the penetrating duct is protected with an approved noncombustible material that resists the free passage of flames & the products of combustion and a fire damper is installed at each floor line.

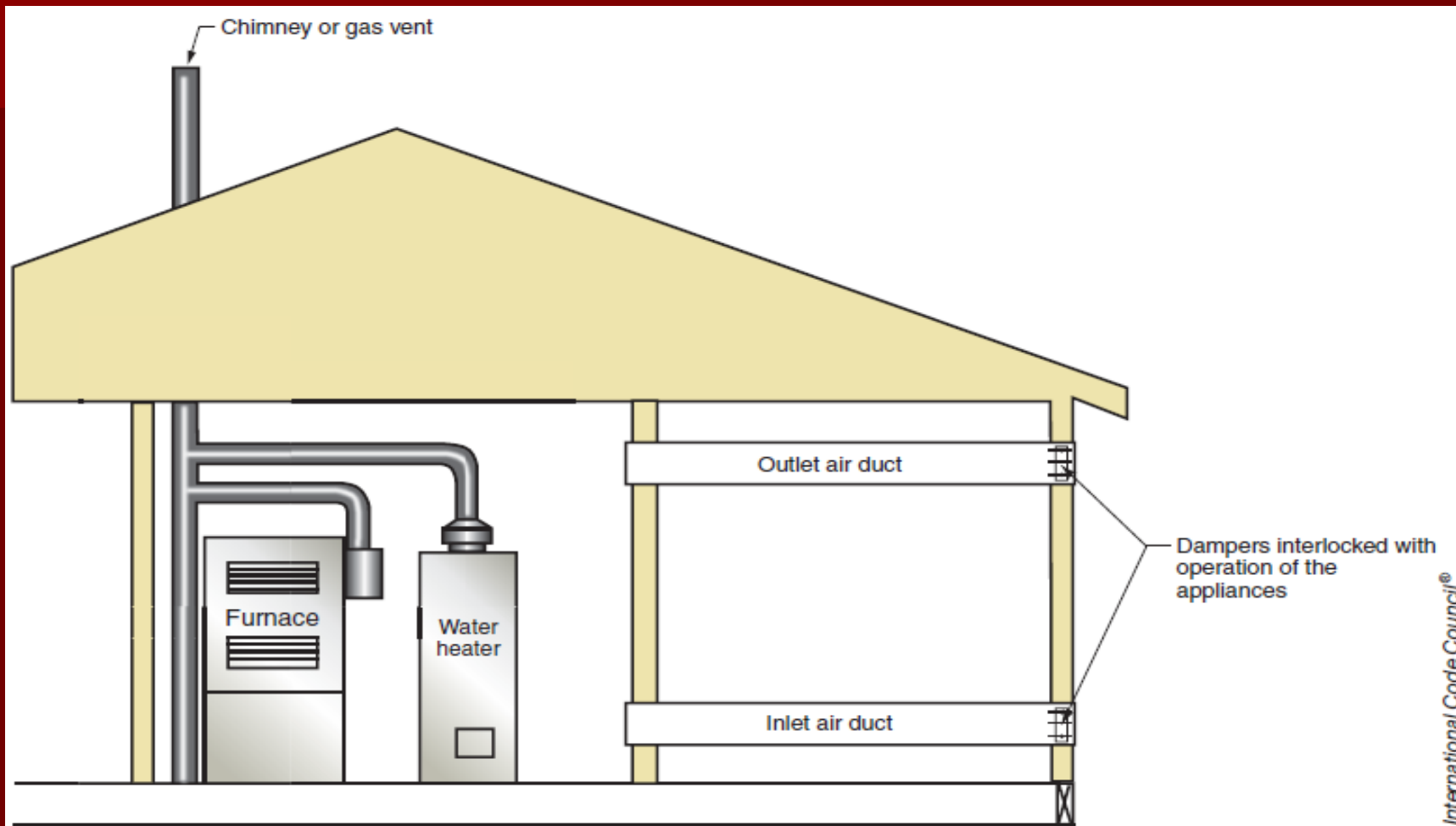
Dampened Combustion Air Openings

IMC 701.2

- Where dampers are installed on combustion air openings, the 2015 code requires an interlock with the appliance to prevent operation of the appliance when the damper is closed. *(now matches req'ts in IFGC)*
- Manual dampers are prohibited on combustion air openings.

Dampened Combustion Air Openings

IMC 701.2



Where dampers are installed on combustion air openings, they must be interlocked to shut down appliances when dampers are closed.

Door Clearance to Vent Terminals

IMC 802.9/SPS 364.0802

- The requirements in IMC 802.9 are not included as part of chs. SPS 361 to 366.
- *The need for vent terminals from appliances and equipment to be located such that doors cannot swing within 12" horizontally of the vent terminal has been removed.*

Door Clearance to Vent Terminals

IMC 802.9/SPS 364.0802



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Prohibited location for vent terminal

Gasketed Fireplace Doors

IMC 903.4

- Gasketed (sealed) doors are prohibited on factory-built fireplaces except where fire places are listed for such use via UL 127



Gasketed doors are prohibited on factory-built fireplaces unless the fireplace is listed for their use.

Related Topic in IBC

SPS 362.0904(2)

- *System interconnection.* Substitute the following wording for IBC 904.12.2: The actuation of the fire suppression system shall automatically shut down all sources of fuel and power to all equipment located beneath the exhaust hood (*for commercial kitchens*) & protected by the suppression system.
- The fuel & power reset shall be manual.

Questions on the 2015 IMC?

